REMARKS

Claims 21-28 are pending and presented for examination in the subject application, with claim 21 being the sole pending independent claim. Claims 1-20 were previously canceled.

Applicants have hereinabove amended claim 21 to place the claim in better form for examination. Support for the amendments to claim 21 may be found, inter alia, in the specification at page 3, lines 3-12; page 4, lines 16-24; and page 12, line 7 through page 14, line 2.

Applicants maintain that no new matter is introduced by this amendment. Accordingly, Applicants respectfully request that this Amendment be entered.

Rejections Under 35 U.S.C. §103(a)

On page 2 of the July 21, 2003 Office Action, claims 21-24 and 28 were rejected under 35 U.S.C. §103(a) as allegedly unpatentable over U.S. Patent No. 5,358,822 to Hou (hereinafter "Hou '822") in view of U.S. Patent No. 4,873,166 to Senga et al. (hereinafter "Senga '166") or U.S. Patent No. 4,032,463 to Kawanishi (hereinafter "Kawanishi '463"), and further in view of Japanese Patent Publication No. 58-152258 (hereinafter "the '258 reference"). On page 6 of the July 21, 2003 Office Action, claims 25-27 were rejected under 35 U.S.C. §103(a) as allegedly unpatentable over Hou '822 in view of Senga '166 or Kawanishi '463 as applied to claims 21-24 and 28 above, and further in view of U.S. Patent No. 3,808,026 to Sato et al. (hereinafter "Sato '026").

The Examiner stated that Hou '822 has been discussed throughout prosecution as disclosing a process of making a liquid toner. The Examiner also stated that in the process of Example 2 a

thermoplastic polymer and a pigment (e.g., carbon black - an inorganic pigment) are placed in a solvent that is a good solvent for the polymer at high temperatures and a poor solvent at lower temperatures. The Examiner stated that the carbon black in Hou '822 meets the requirements of both a coloring agent and inorganic particles because it is both of these. The Examiner further stated that thus a single component meets the requirements of each claimed component. The Examiner stated that the polymer and pigment are heated to a temperature of 70°C where the polymer is dissolved and then cooled to 0°C so the polymer precipitates with the pigment.

The Examiner stated that precipitated polymer particles are removed from the solvent and then redispersed in ISOPAR and mixed with cupric naphthenate along with a steric stabilizer (apparently a dispersant). The Examiner further stated that Hou '822 discloses cupric naphthenate and zirconium octoate (i.e., zirconium octylate) as alternative charge control agents. The Examiner stated that Hou '822 states that either organic or inorganic colorants may be used in the process. The Examiner further stated that the colorants, such as a pigment, are either embedded in the particle or are attached to the surface of the particle. The Examiner stated that Hou '822 shows concern for the particle size of the produced polymer particles and states that the process gives small and uniform particles.

The Examiner acknowledged that Hou '822 does not mention the solubility parameter of the solvent.

The Examiner alleged that it is apparent from the disclosure and would be understood by the artisan that the solubility parameter is chosen do that the polymer will dissolve out of the solvent and form either a coating on the pigment or a particle with the

pigment embedded. The Examiner further alleged that the artisan would understand that the solubility parameter would control the size of the formed polymer particle.

The Examiner stated that this is evidenced by Senga '166 and Kawanishi '463, both directed to the formation of liquid developers having resin (i.e. polymer) particles.

The Examiner stated that Senga '166 states "The particle diameter depends mostly on solubility parameter of the produced polymer and solvents and so the particle diameter can be controlled by suitable selection of them."

The Examiner stated that Kawanishi '463 discusses the relationship of the solubility parameter of a polymer and the solvent in the formation of a developer having polymer particles. The Examiner also stated that Kawanishi '463 teaches that size of the toner particles is controlled by judicious choice of the polymer solubility parameter with reference to the solubility parameter of the liquid.

The Examiner acknowledged that the reference does not state that the polymer is substantially insoluble in the solvent at room temperature. However, the Examiner stated that it is apparent that the resin is insoluble in the solvent at a temperature of 0°C or above because the resin particle are formed by cooling using a cooling bath of 0°C. The Examiner also stated that the resin's solubility temperature (i.e., the temperature at which it changes from being soluble to insoluble) is below 70°C because this is the temperature where the polymer is in a dissolved state and mixed as seen in the Example.

The Examiner alleged that it would have been obvious to one

having ordinary skill in the art at the time the invention was made to choose a combination of polymer and solvent in Hou '822 so that the polymer is insoluble in the solvent at room temperature because the reference states that cooling of the resin solution occurs at a high cooling rate and the mixture is cooled to 0°C. The Examiner also alleged that this would suggest that resin's solubility temperature in the solvent is at a higher temperature than the cooling bath temperature of 0°C because small particles are desired. The Examiner further alleged that in order to form small particles the artisan would want to move quickly through the solubility temperature because a slow progression through the solubility temperature would cause more resin to deposit on and with the pigment particles. The Examiner further alleged that fine particles would be more difficult to form. The Examiner alleged that no criticality is given for the solubility temperature in the reference other than the requirement that it be at or above 0°C. The Examiner further alleged that thus the artisan would have been expected to choose a temperature for the solubility temperature of the resin in the solvent that would aid formation of fine particles. The Examiner alleged that a temperature higher than 0°C would, therefore, have been obvious. The Examiner further alleged that solubility temperature at room temperature or above but below 70°C (the temperature where the polymer is shown to be soluble) would have been obvious because room temperature is far above the cooling bath temperature and small (i.e., fine) particles would have been expected to form readily during the rapid cooling. The Examiner alleged that the artisan would have found it obvious to control the solubility parameter of the polymer and the solvent because the supporting references teach that the particle diameter of the polymer is a result effecting variable in control of the polymer particle size. The Examiner also alleged that because Hou '822 is specifically concerned with polymer particle size in the

liquid developer and the supporting references teach that polymer and solvent solubility parameter control particle size, the artisan would have found it obvious to optimize the solubility parameter of the polymer and solvent to obtain the desire particle size in Hou '822.

The Examiner stated that the newly applied secondary references establish that the difference in solubility parameter of a polymer and solvent are known to control the size of the polymer particles. The Examiner further stated that the art clearly suggests the limitation in claim 21 concerning the relationship of SP value of the solvent and the polymer and particle size of the resultant resin particle.

The Examiner stated that Hou '822 clearly shows that the artisan is able to choose a resin that will be insoluble in a solvent in one temperature but soluble at a higher temperature. The Examiner further stated that the reference clearly indicates that such determinations are well within the level of skill in the art.

The Examiner alleged that the artisan would have been expected to choose a solubility temperature between that of the ice bath (0°) and the mixing temperature (70°) because the polymer must solidify at a temperature within this range. The Examiner further alleged that the choice of a specific temperature in this range would have been obvious for the reasons give above.

The Examiner stated that the solubility parameter is not identified in the claims as identifying the resin that cannot be dissolved at room temperature as asserted in the response. The Examiner further stated that the claim states that the solubility parameter controls the size of the produced toner particle. The

Examiner stated that this feature is taught by the supporting art as discussed above. The Examiner also stated that there is also no requirement that an electric viscous fluid is formed nor is there any indicating that Hou '822 liquid developer does not have these features.

Regarding the rejection of claims 25-27, the Examiner acknowledged that Hou '822, Senga '166 and Kawanishi '463 do not disclose silica and titanium oxide as a component of the toner.

The Examiner stated that Sato '026 discloses silica and titanium oxide as a white pigment in a liquid toner. The Examiner further stated that these pigments are effective for forming an image that is non-contrasting with the image background.

The Examiner alleged that it would have been obvious to one having ordinary skill in the art at the time the invention was made to use silica or titanium oxide as the pigment in the liquid toner of Hou '822 because a white pigment in the toner allows for development of the image background.

The Examiner stated that development of the background area on the photoreceptors permits neutralization of background charges and allows clear images to be formed. The Examiner further stated that it appears that silica would have hydroxide groups attached to its surface because silica is a hydrophilic substance. The Examiner stated that water absorbed on the silica surface would give hydroxide groups.

The Examiner stated that Applicant is understood to traverse this rejection because it is not seen as disclosing the control of particle size by solubility parameter. The Examiner further acknowledged that Applicant is correct that this feature is not

taught by Sato '026.

The Examiner stated that Hou '822, Senga '166 and Kawanishi '463 teach that the particle size of a toner particle is controlled, at least in part, by the solubility parameter of the resin and solvent.

Applicants maintain that the cited art does not render obvious the invention claimed in claim 21 as amended. The claimed invention is patentable over the cited art for at least the following reasons.

This application relates to providing a liquid toner composition containing toner particles which do not exhibit high agglomerating force and are excellent in dispersion capability during storage and development of the composition. The application embodies the recognition that when a thermoplastic resin dissolved in a specific solvent is cooled to precipitate toner particles, the particle diameter of toner particles can be adjusted on the basis of the difference in SP value between the resin and the solvent. Thus, the liquid toner is allowed to have characteristics similar to those of an electrorheological fluid, and the liquid toner composition using that liquid toner ensures high (or stable) image quality.

For example, claim 21 is directed to a method of manufacturing a liquid toner composition for electrophotography. A thermoplastic resin is heated within a solvent capable of dissolving said thermoplastic resin when heated and substantially incapable of dissolving said resin at room temperature, an SP (solubility parameter) value of said solvent being adjusted to control the particle diameter of toner particles on a basis of a difference between an SP value of the resin and the SP value of the solvent,

while stirring the thermoplastic resin in said solvent together with inorganic particles and a coloring agent, to thereby dissolve said thermoplastic resin in said solvent. The mixture is cooled to permit precipitation of the toner particles containing said thermoplastic resin and coloring agent as main components and having the inorganic particles attached to at least surfaces thereof or containing the inorganic particles thus imparting properties of electrorheological fluid to the liquid toner.

Applicants simply do not find teaching or suggestion in Hou '822 that a method as claimed in amended claim 21 can be practiced to impart the properties of an electrorheological fluid to the liquid toner.

Senga '166, as understood by Applicants, relates to a process for producing a liquid developer and it discusses that the solubility parameter (SP value) is a factor that controls the grain diameter. However, the toner producing process of Senga '166 is of a polymerization type, whereas the method of manufacturing a toner composition of the present application is a precipitation type. Polymerization methods and precipitation methods are entirely different from each other. A person having ordinary skill in the art would understand that the present application and Senga '166 are directed to toner production methods of entirely different concepts and they involve entirely different producing processes. Accordingly, Applicants strongly disagree with the assertion in the Office Action that the claimed invention can be rendered obvious by Senga '166 in combination with other cited art.

Kawanishi '463 and the present application are entirely different from each other in the form of toner particles obtained by the

respective methods. More specifically, according to Kawanishi '463, the resin is dissolved in a solvent as shown exemplarily in Figure A of Exhibit A attached hereto. This fact is clear from EXAMPLES 1 to 4 provided in columns 3 to 6 of Kawanishi '463. For example, EXAMPLE 1 provided in column 3, lines 47-53 discusses that a blend (A) of toner particles having a diameter of 0.6 μm can be obtained by blending the components listed in column 3, lines 48-53 with a ball-mill for 23 hours. A person having ordinary skill in the art with a common technical knowledge that the term "blending" means a unit operation of crushing a cluster, not a unit operation for producing precipitated particles as in the present invention. According to Kawanishi '463, the pigment aggregate is crushed to make the particles as small as possible with a mill. It is well known to a person having ordinary sill in the art that toner cannot be manufactured with the method of Kawanishi '463 as long as the resin is not a type soluble to the solvent.

By contrast, the claimed invention, as recited in our proposed claim 21, provides toner particles containing the thermoplastic resin and coloring agent as main components and having the inorganic particles attached to at least surfaces thereof or containing the inorganic particles are precipitated, thereby imparting the properties of electrorheological fluid to the liquid toner. Reference Figure B of Exhibit A attached hereto schematically shows the form of the toner particle of the present invention. As shown in this figure, the resin, coloring agents and inorganic fine particles are wrapped within the toner particle. Any of EXAMPLES 1 to 4 provided in Kawanishi '463 does not disclose such a toner particle as provided by the claimed invention.

Kawanishi '463 mentions a solubility parameter, but Kawanishi

'463 uses the parameter as a scale of solubility to a solvent. Thus, this reference does not use the solubility parameter as a parameter for controlling the diameter of precipitated particles when thermoplastic resin particles are prepared by precipitation as in the present invention.

A toner manufactured according to the methodologies of Kawanishi '463 is of a type in which a resin is adsorbed on coloring agent aggregates dispersed in a solvent, and the toner is blended with a mill to disperse the coloring agent. Toner particles such as taught in the present application cannot be obtained by using the methodologies of Kawanishi '463.

The '258 reference, as understood by Applicants, relates to a method of producing a wet-type toner in which thermoplastic resin particles are dispersed in an electronic insulating liquid. However, the '258 reference makes no mention of a technical concept of the solubility parameter as in the present application, or making toner particles as in a similar process to that of the claimed invention.

As described above, the claimed invention recited in amended claim 21 would not have been obvious to a person having ordinary skill in the art by drawing from the teachings and suggestions of Hou '822, Senga '166, Kawanishi '463 and the '258 reference, without impermissibly using the claim as a roadmap to reconstruct the claimed invention in hindsight.

In addition, a combination of the cited references still does not suggest a remarkable advantageous effect of the claimed invention of being able to obtain a high quality image through a structure obtained from (i) heating the thermoplastic resin within the above-specified solvent, while stirring the resin with inorganic

particles and a coloring agent, to thereby dissolve the thermoplastic resin the solvent, and (ii) cooling the mixture to permit precipitation of the toner particles containing said thermoplastic resin and coloring agent as main components and having the inorganic particles attached to at least surfaces thereof or containing the inorganic particles, thus imparting properties of electrorheological fluid to the liquid toner.

Regarding claims 22-28, Applicants respectfully point out that claims 22-28 depend on and include all the limitations of claim 21. Thus, claims 22-28 are patentable at least for the reasons set forth above with respect to claim 21.

Accordingly, Applicants respectfully request that the Examiner reconsider and withdraw the rejections of claims 21-28 under 35 U.S.C. §103.

In view of the amendments to the claims and remarks hereinabove, Applicants maintain that claims 21-28 are now in condition for allowance. Accordingly, Applicants earnestly solicit the allowance of claims 21-28.

If a telephone interview would be of assistance in advancing prosecution of the subject application, Applicants' undersigned attorneys invite the Examiner to telephone them at the telephone number provided below.

If a petition for an additional extension of time is required to make this response timely, this paper should be considered to be such a petition, and the Commissioner is authorized to charge the requisite fees to our Deposit Account No. 03-3125.

No fee is deemed necessary in connection with the filing of this

Amendment. However, if any additional fee is required, authorization is hereby given to charge the amount of any such fee to Deposit Account No. 03-3125.

Respectfully submitted,

John P. White, Reg. No. 28,678
Paul Teng, Reg. No. 40,837
Attorneys for Applicants
Cooper & Dunham LLP
1185 Avenue of the Americas
New York, New York 10036
(212) 278-0400

I hereby certify that this correspondence is being deposited this date with the U.S. Postal Service with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

October 16, 2003
Paul Teng Date
Reg. No. 40,837